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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

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TITLE OF THE INVENTION (280 characters max)

BROADBAND COMMUNICATION ACCESS DEVICE

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ENCLOSED APPLICATION PARTS (check all that apply)

☒ Specification — Number of Pages 9 — ☐ Small Entity Statement
- ☐ Independent Inventor
- ☐ Small Business Concern
- ☐ Nonprofit Organization
- ☐ Non-Inventor Supporting Claim By Another

☒ Drawing(s) — Number of Sheets 11 — ☒ Other (specify) 11 Presentation Pages

METHOD OF PAYMENT OF FILING FEE FOR THIS PROVISIONAL APPLICATION

☒ A check in the amount of $ 150.00 is enclosed to cover the filing fee.

☒ The Commissioner is hereby authorized to charge the filing fee or credit any overpayment to Deposit Account No. 02-0375.

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: _____

Respectfully submitted,

By _____
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Date March 16, 2000
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BROADBAND COMMUNICATION ACCESS DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a broadband communication access device.

2. Description of Related Art

With the advent of the communication technologies and breakthroughs in Digital Signal Processing (DSP), DSL, and Wireless, more bandwidths are now available for home communications than were once provided by traditional voice-grade analog modems. Because of this, there is widespread interest among home users in faster access to content provided by service providers via high-speed facilities such as DSL, cable, and wireless. This interest appears to be driving the evolution of the home communications from narrow band applications to broadband applications.

Before DSL, broadband access via shared Local Area Network (LAN), Frame Relay or Asynchronous Transmission Mode (ATM) has only been used by commercial or business applications, while most to-home communications are narrow band and use either Integrated Service Digital Network (ISDN) line or analog modems. Besides the difference in bandwidth, another key difference between narrow band and broadband communications is operational complexity -- the service provisioning process is required by the broadband applications. Normally, a trained professional is required in the office environment to manage such complexity. It is undesirable and costly, however, to have trained networking personnel managing a home network.

Figs. 1 and **2** depict known home gateway devices for high-speed communications. **Fig. 1** depicts a personal computer interface (PCI) based ASDL home gateway, while **Fig. 2** depicts a stand-alone ASDL home gateway. These gateway devices are similar to those that are commonly used in offices. In other words, the function and the design of today's home networking device, i.e., home gateway, is directly related to the one used in the office environment today. Thus, the known devices are complex, and difficult to use. In addition, home users are

required to install Ethernet cables to connect PCs to form a LAN in order to share resources. Home users are also required to install software provided by the vendor for configurations, and to recognize the difference and the type of interfaces. Finally, information accesses, and in particular, the Internet, is only available through a PC, which is connected to the gateway.

SUMMARY OF THE INVENTION

Therefore, a need has arisen for a broadband communication access device that overcomes these and other disadvantages of the related art.

One embodiment of the present invention integrates a DSL modem, an analog modem, a wireless interface, and a home phone network interface into a screen-phone for the broadband communication service to home users. Multiple users are able to access the Internet and the content services for conducting e-commerce, receiving content news, entertaining on-demand, making audio or video communications, and telecommuting or working at home. This screen-phone based DSL broadband communication access device allows in-home communications for the purpose of resource sharing among home computing devices via the existing but not limited to phone wire, wireless or cable.

The complexity of the broadband equipment, such as DSL home gateway, used in the home environment is minimized, without sacrificing the communication capability. In particular, embodiments of the present invention:

- Hide the Internet Routing Protocol based LAN concept from the typical home users.
- No Internet Protocol (IP) router or bridge device should be visible to the home users
- Provide automatic service provisioning and configurations
- May provide the Plug-and-Play connection to home based electronics devices, which include, but not limited to, a WEB pad, a cellular phone, lap-top or notebook computer, desk-top PC, personal data access (PDA) device, smart appliances, TV, alarm system, etc.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic of a PCI-based ADSL Home Gateway.

Fig. 2 is a schematic of a stand-alone ADSL Home Gateway.

Fig. 3 is a schematic of a phone-based and Integrated Home Gateway.

Fig. 4 is a schematic of a phone-based Wireless only Home Gateway.

Fig. 5 is a schematic of phone-based Home Gateway Components.

Fig. 6 is a diagram of a broadband communication access device architecture according to one embodiment of the present invention.

Fig. 7 is a state diagram of a high level software architecture according to one embodiment of the present invention.

Fig. 8 is a state diagram of a session manager according to one embodiment of the present invention.

Fig. 9 is a state diagram of a service manager according to one embodiment of the present invention.

Fig. 10 is a state diagram of an interface manager according to one embodiment of the present invention.

Fig. 11 is a state diagram of a display manager according to one embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Embodiments of the present invention and their technical advantages may be better understood by referring to **Figs. 3** through **11**, like numerals referring to like and corresponding parts of the various drawings.

Referring to **Fig. 3-5**, a home gateway product according to one embodiment of the present invention is provided. In order to hide the complexity of the device from the ordinary home user, no configuration and no IP router, or bridge devices, are visible to home users. To accomplish this, the traditional stand-alone IP specific router or bridge device is removed from the home environment. All the home gateway functions are integrated into an existing home-friendly device. In one embodiment, this may be a telephone set with a display screen (screen phone).

A removable display unit for displaying and accessing both Internet and voice messages may be provided. Home users may subscribe the specific

information from the Internet content provider and display them on the screen through an always-on Internet access. For example, home users may, but not limited to, subscribe the following for the display: the real-time stock quote, weather, headline news, community news, yellow pages through the service providers. This removable display unit is also a personal portable device and can be operated outside of the house via the wireless communications.

In one embodiment, the removable display may be a connected organizer with a display, such as the Palm connected organizers, manufactured by 3Com. In another embodiment, a CRT may be used to display the data.

In another embodiment, the display may comprise a touch-sensitive screen for entering data or information. Other suitable input devices may be used.

In one embodiment, home electronic devices, such as a WEB pad, a cellular phone, a lap top or notebook computer, a desk top personal computer, a PDA, smart appliances, alarm systems, home video monitoring equipment, etc. may interface with the device through modular host interfaces. These may use the plug and play configuration.

The modem unit may include both DSL and analog modems. A DSL modem (DSL Remote Terminating Unit), may include one of the following: ADSL, SDSL, HDSL and VDSL, and may be integrated inside a phone set (Gateway), which provides an always-on Internet connectivity. An analog modem, such as V.90 56Kbps using POTS channel, may be also integrated inside the phone set (Gateway) for the purpose of providing the channel redundancy, the broadband service provisioning and configuration.

Referring to **Fig. 4**, this figure shows a flexibility of this invention to operate on the wireless interface and to connect home devices through a plugging Radio interface. Similar operation applied to other interfaces such as home phone line, cable, and satellite. This invention allows multiple interfaces coexisted in the home gateway.

According to one embodiment of the present invention, modular Plug-and-Play and turn-key interfaces may be included for connecting home devices via the existing phone line, power line, wireless or cable. One or more interfaces may coexist at the same time based on the need of a particular home environment. The

home devices include, but not limited to, desk-top PC, lap-top notebook, home security device, cellular phone, personal data access device, smart IP-based home appliance, printer, facsimile machine, scanner, etc.

In another embodiment, an embedded video camera for video communications may be provided. An embedded video camera may provide the capability for video conferencing, either one-to-one or one-to-many persons, medical diagnostics, security monitor, etc. These applications are available to home users whenever the services are available through the Internet connection. In addition, a user may remotely monitor a single or multiple areas through the Internet.

Referring to **Figs. 6-11**, a broadband communication access device according to one embodiment of the present invention is disclosed. The broadband communication access device provides both in home and home to home communications. Characteristics of the broadband communication access device may include Plug-N-Play ("PnP") capability that hides the Internet Protocol ("IP") and broadband configuration from the ordinary user. In addition, it may be modular in design.

The broadband communication access device may have the following features:

- PnP made easy
- USB based HPNA module to provide up to 10 Mbps for in-home communications
- Always connected Internet service for multiple users to access both voice and data simultaneously
- Provide both wired and wireless for in- and to- home communications
- Smart IP-home ready.
- PnP wireless module for IEEE 802.11 or bluetooth technology
- Build in a thin WAP proxy server for WAP-enabled devices to communicate Internet services via push and pull technology
- Automatic broadband service provisioning.

While the invention has been described in connection with preferred embodiments and examples, it will be understood by those skilled in the art that other variations and modifications of the preferred embodiments described above may be made without departing from the scope of the invention. Other embodiments will be apparent to those skilled in the art from a consideration of the specification or practice of the invention disclosed herein. It is intended that the specification is considered as exemplary only, with the true scope and spirit of the invention being indicated by the following claims.

CLAIMS

What is claimed is:

1. A broadband communication access device, comprising:
a communication interface for connecting to a network;
a processor for processing information from the network;
a display for displaying the information.

2. The broadband communication access device of claim 1, wherein the communication interface is selected from the group consisting of POTS, DSL, and combinations thereof.

3. The broadband communication access device of claim 1, further comprising:
at least one module for interfacing with an external device.

4. The broadband communication access device of claim 3, wherein the external device is selected from the group consisting of a desk-top PC, lap-top computer, notebook computer, a home security device, a cellular phone, a digital phone, a personal data access device, a smart IP-based home appliance, a printer, a facsimile machine, a scanner, a connected organizer, and combinations thereof.

5. The broadband communication access device of claim 1, further comprising a multi-function handset.

6. The broadband communication access device of claim 5, wherein the multi-function handset performs the function of at least one of a cordless phone, a mobile phone, a web phone, and a walkie-talkie.

7. The broadband communication access device of claim 1, wherein the communication interface includes at least one of DSL modem and an analog modem.

8. The broadband communication access device of claim 7, wherein the DSL modem includes at least one of ADSL, SDSL, HDSL and VDSL.

9. The broadband communication access device of claim 1, comprising modular plug-and-play interfaces.

10. The broadband communication access device of claim 9, wherein the modular plug-and-play interfaces connect home devices via at least one of an existing phone line, a power line, wireless or cable.

11. The broadband communication access device of claim 1, wherein the display comprises a removable display unit

12. The broadband communication access device of claim 11, wherein the removable display unit interfaces with the broadband communication access device through wirelessly.

13. The broadband communication access device of claim 12, wherein the removable display unit interfaces with the broadband communication access device through at least one of IR and RF communications.

14. The broadband communication access device of claim 1, wherein the display displays and accesses at least one of Internet messages and voice messages.

15. The broadband communication access device of claim 1, wherein the display displays at least one of a real-time stock quote, weather, headline news, community news, and yellow pages.

16. The broadband communication access device of claim 1, further comprises an video camera.

BROADBAND COMMUNICATION ACCESS DEVICE

ABSTRACT OF THE DISCLOSURE

A broadband communication access device is disclosed. According to one embodiment of the present invention, a DSL modem, an analog modem, a wireless interface, and a home phone network are integrated to interface into a screen-phone for the broadband communication service to home users. Multiple users are able to access the Internet and the content services for conducting e-commerce, receiving content news, entertaining on-demand, making audio or video communications, and telecommuting or working at home. This broadband communication access device allows in-home communications for the purpose of resource sharing among home computing devices via the existing but not limited to phone wire, wireless or cable.

Figure 1: PCI based ADSL Home Gateway

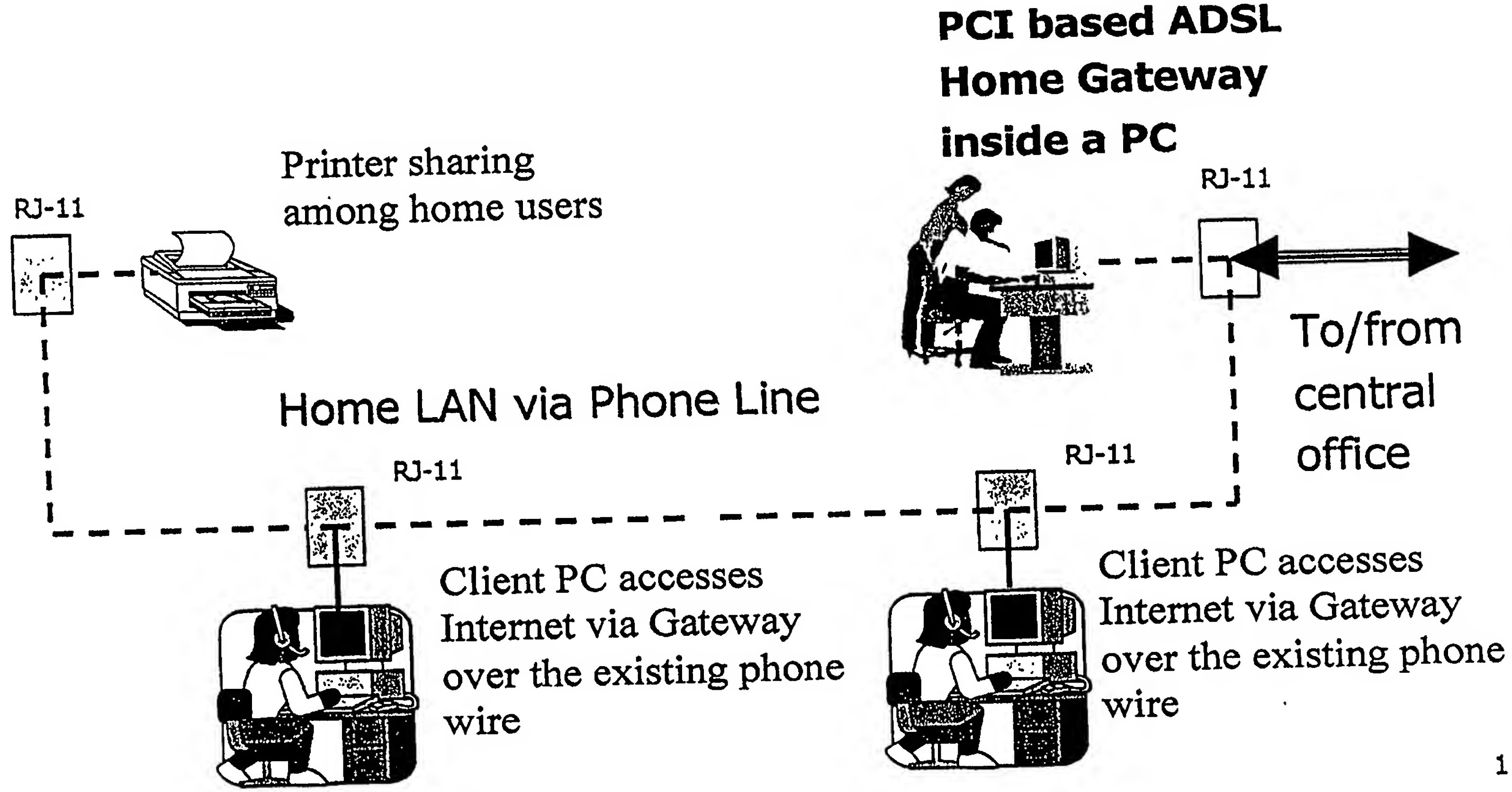
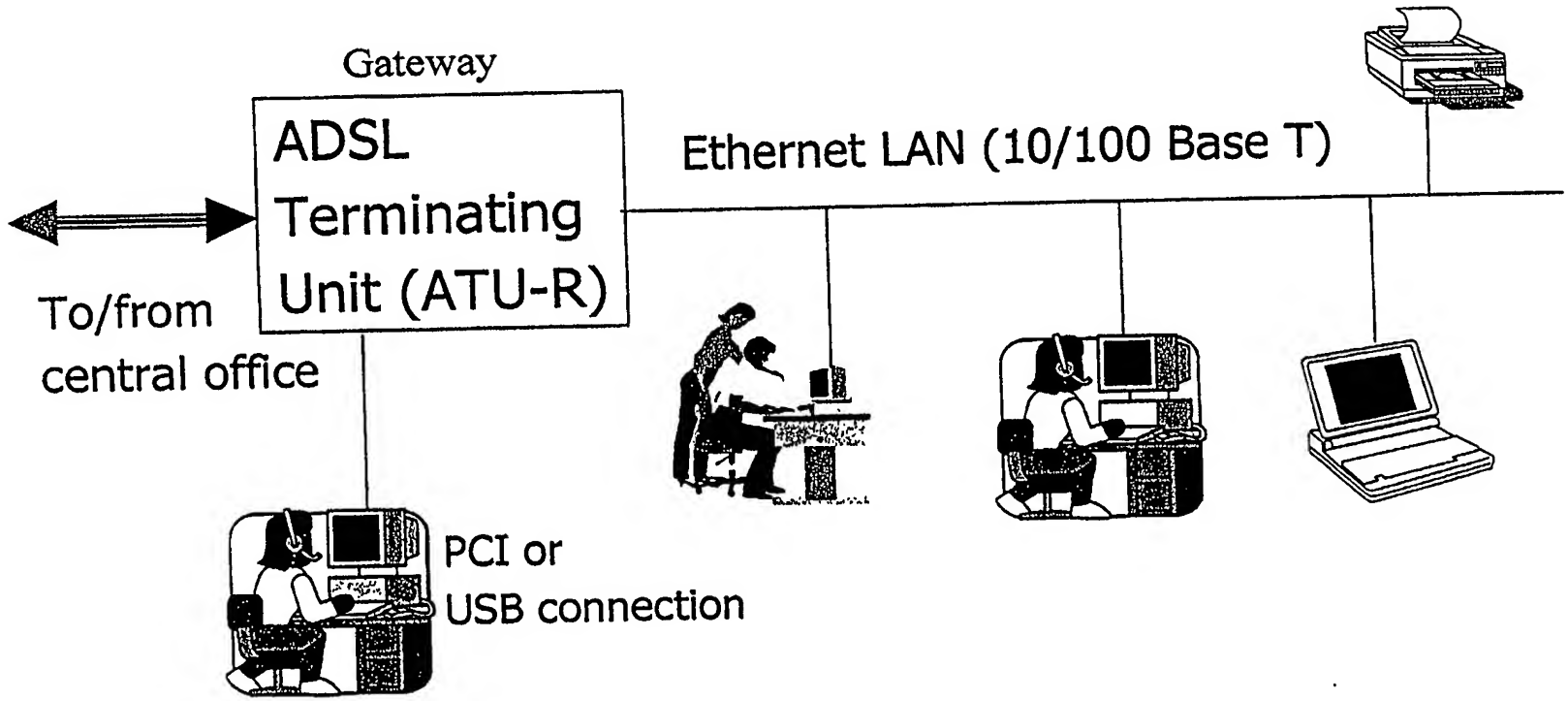


Figure 2: Stand-alone ADSL Home Gateway



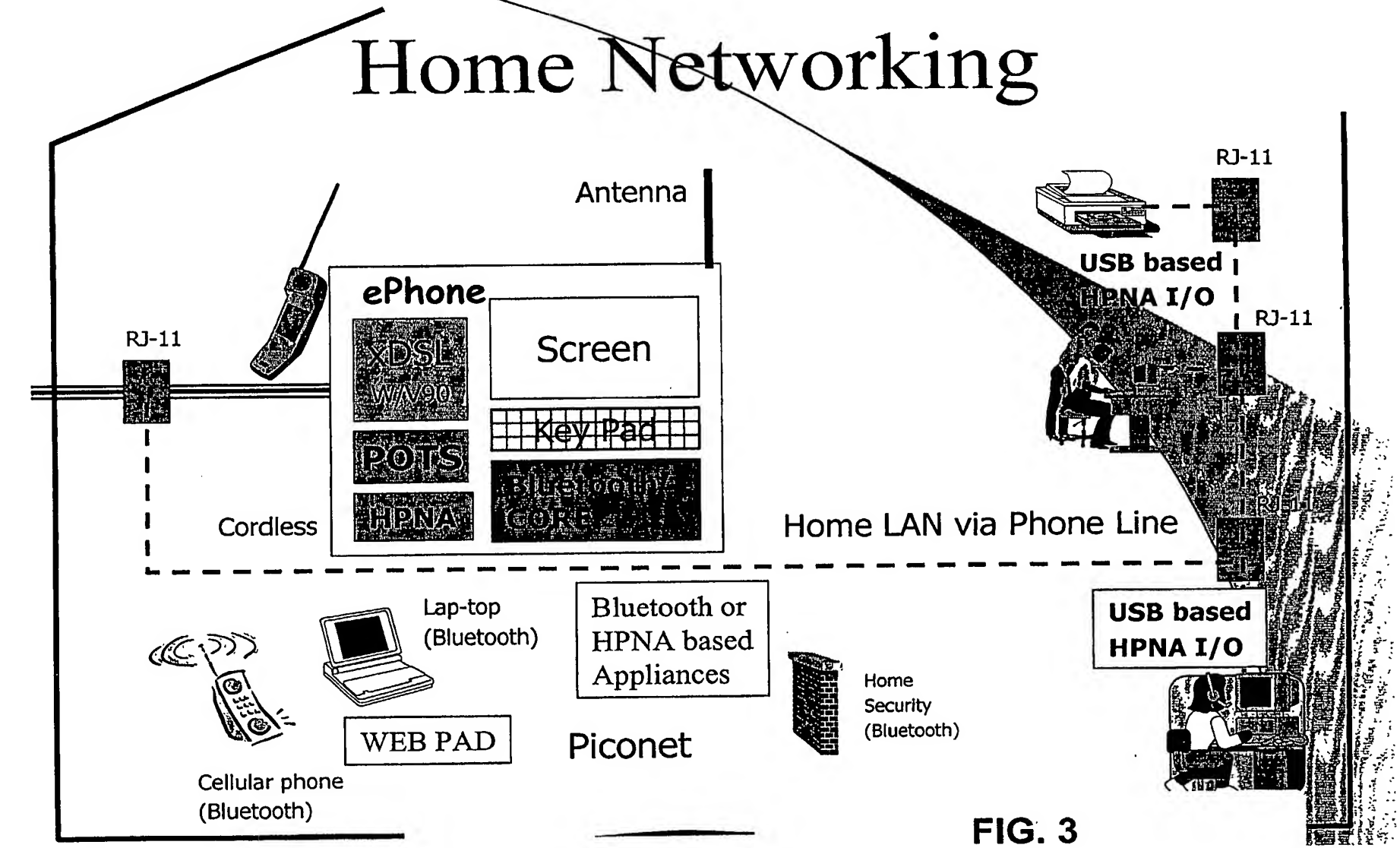

Home Networking
Antenna
RJ-11
ePhone
xDSL
V.90
POTS
HPNA
Screen
Key Pad
Bluetooth
CORE
Cordless
RJ-11
USB based
HPNA I/O
RJ-11
Home LAN via Phone Line
USB based
HPNA I/O
Lap-top
(Bluetooth)
Bluetooth or
HPNA based
Appliances
Home
Security
(Bluetooth)
WEB PAD
Piconet
Cellular phone
(Bluetooth)

FIG. 3

Figure 4: Phone-based Wireless Only Home Gateway

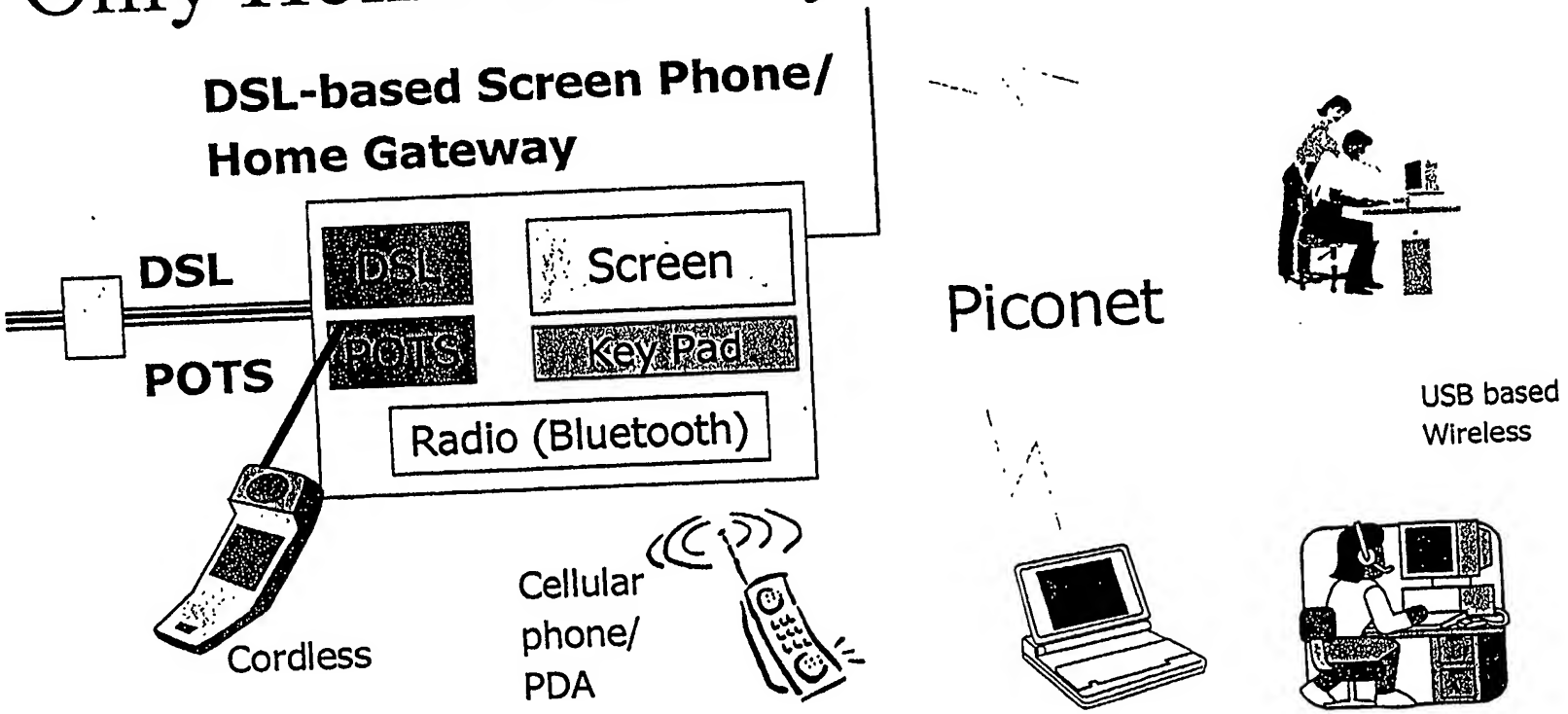
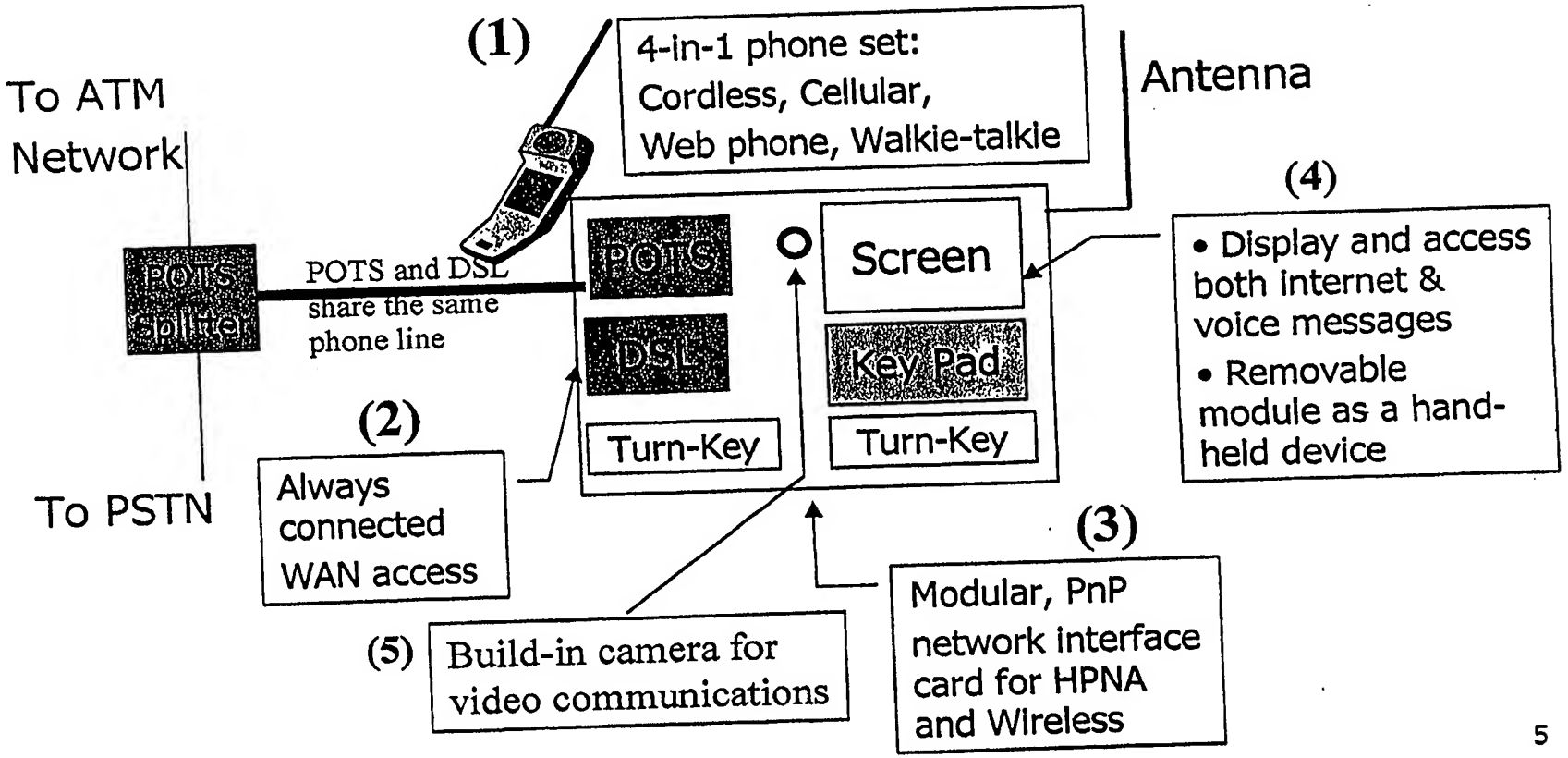


Figure 5: Phone-based Home Gateway Components



Architecture

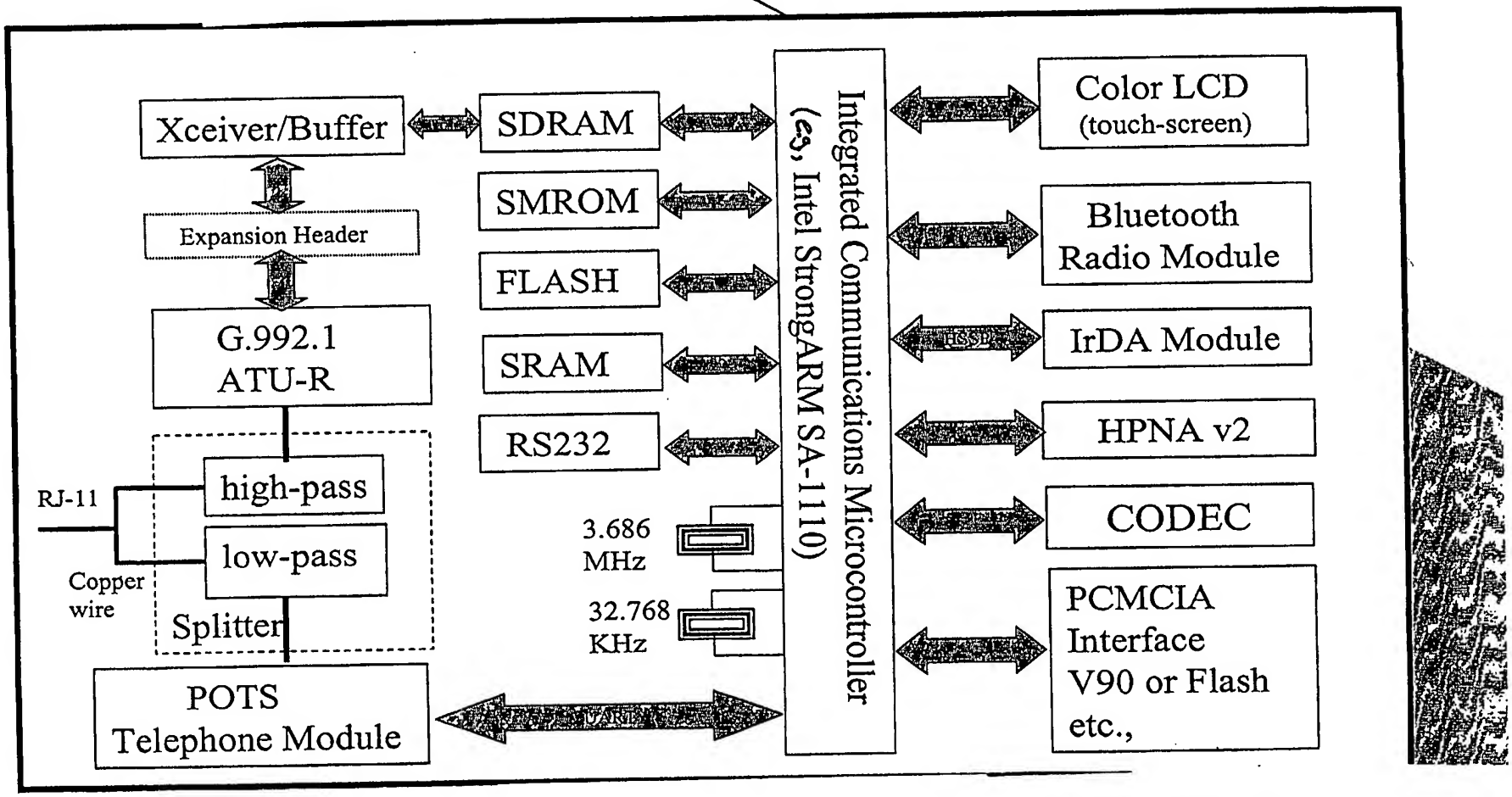


FIG. 6

High Level Software Architecture

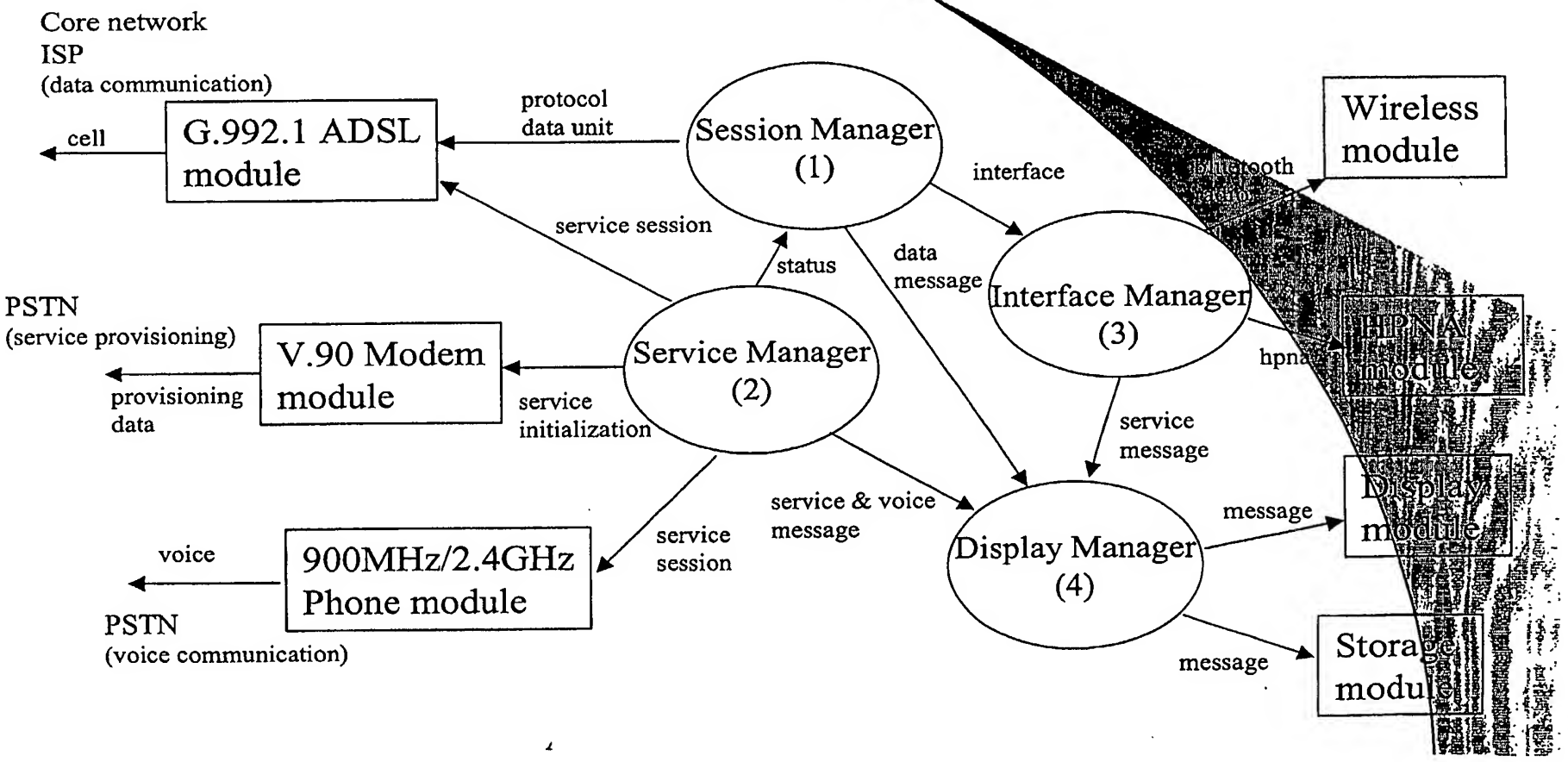


FIG. 7

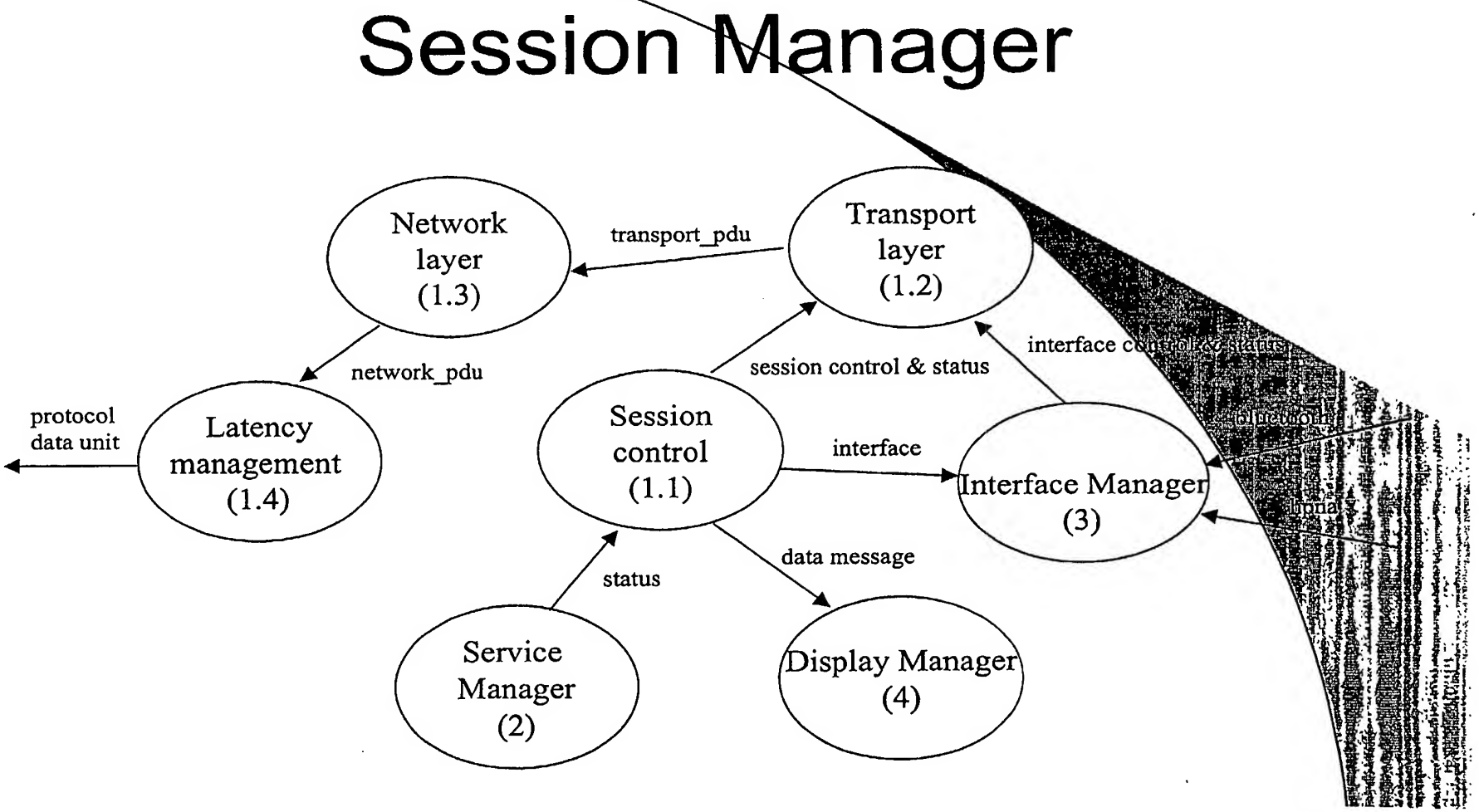

Session Manager
Network layer (1.3)
transport_pdu
Transport layer (1.2)
network_pdu
session control & status
protocol data unit
Latency management (1.4)
Session control (1.1)
interface
Interface Manager (3)
status
data message
Service Manager (2)
Display Manager (4)

FIG. 8

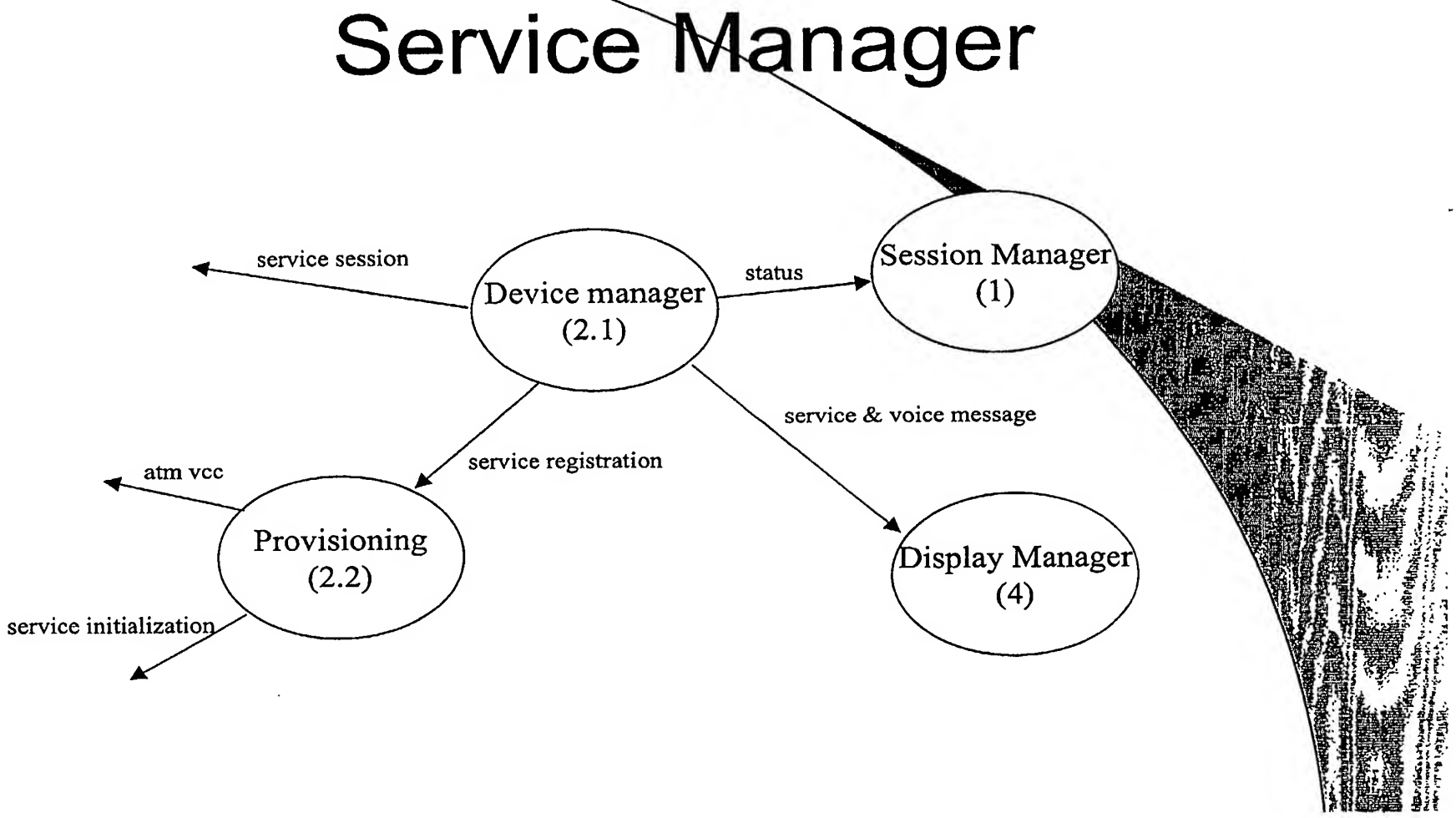

Service Manager
service session
Device manager
(2.1)
status
Session Manager
(1)
service & voice message
service registration
atm vcc
Provisioning
(2.2)
Display Manager
(4)
service initialization

FIG. 9

Interface Manager

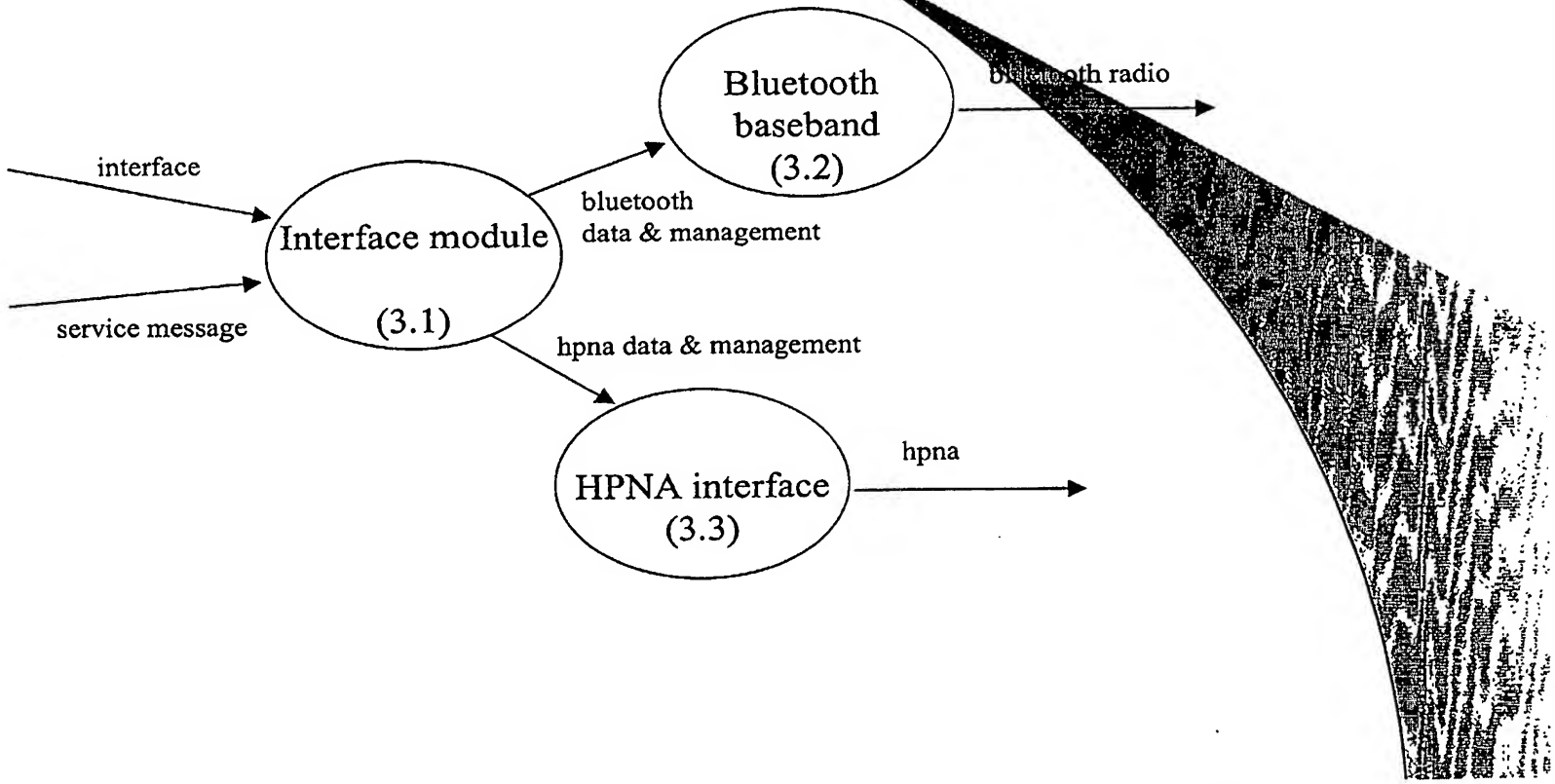


FIG. 10

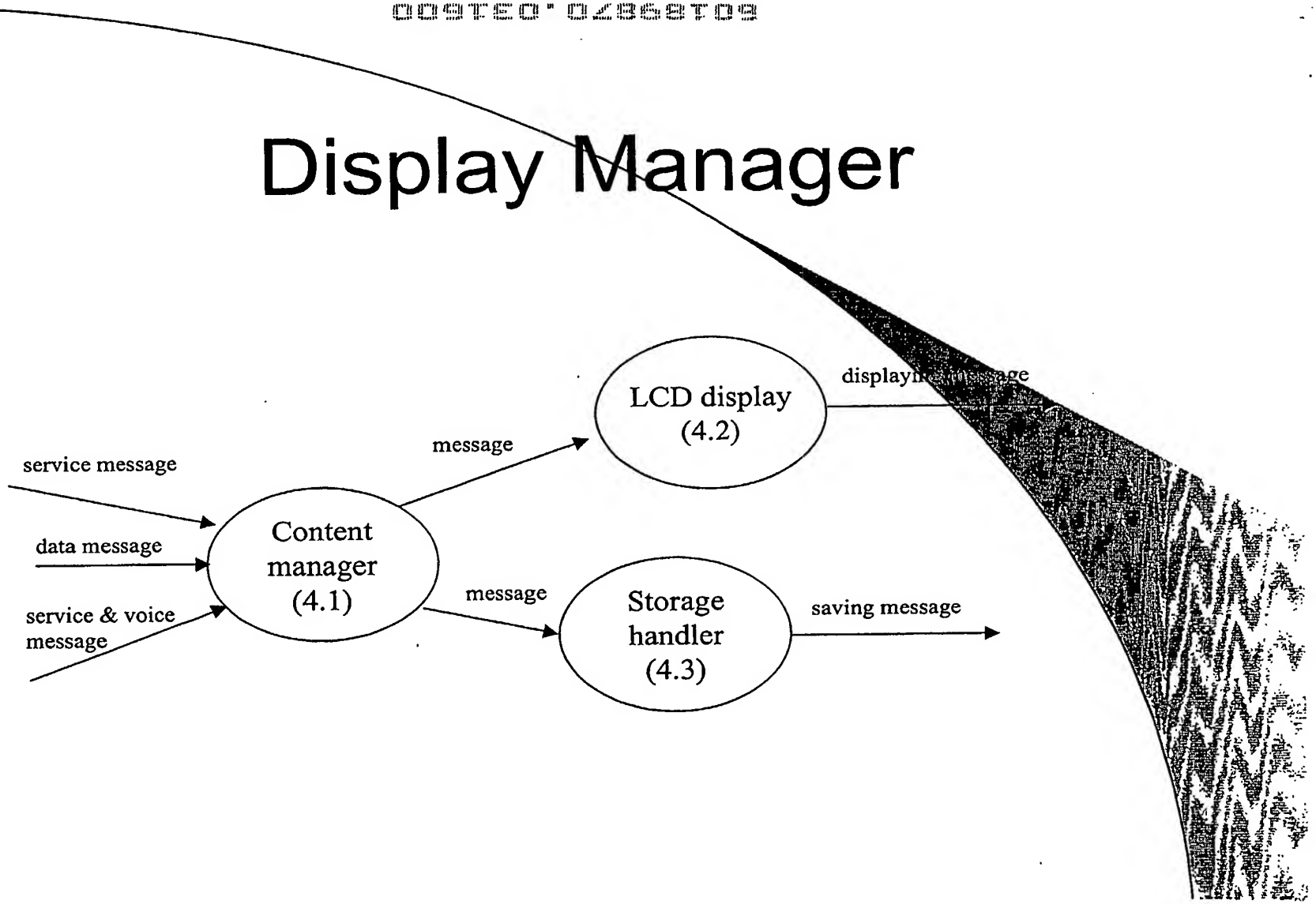

Display Manager
LCD display
(4.2)
displaying message
message
service message
data message
service & voice
message
Content
manager
(4.1)
message
Storage
handler
(4.3)
saving message

FIG. 11

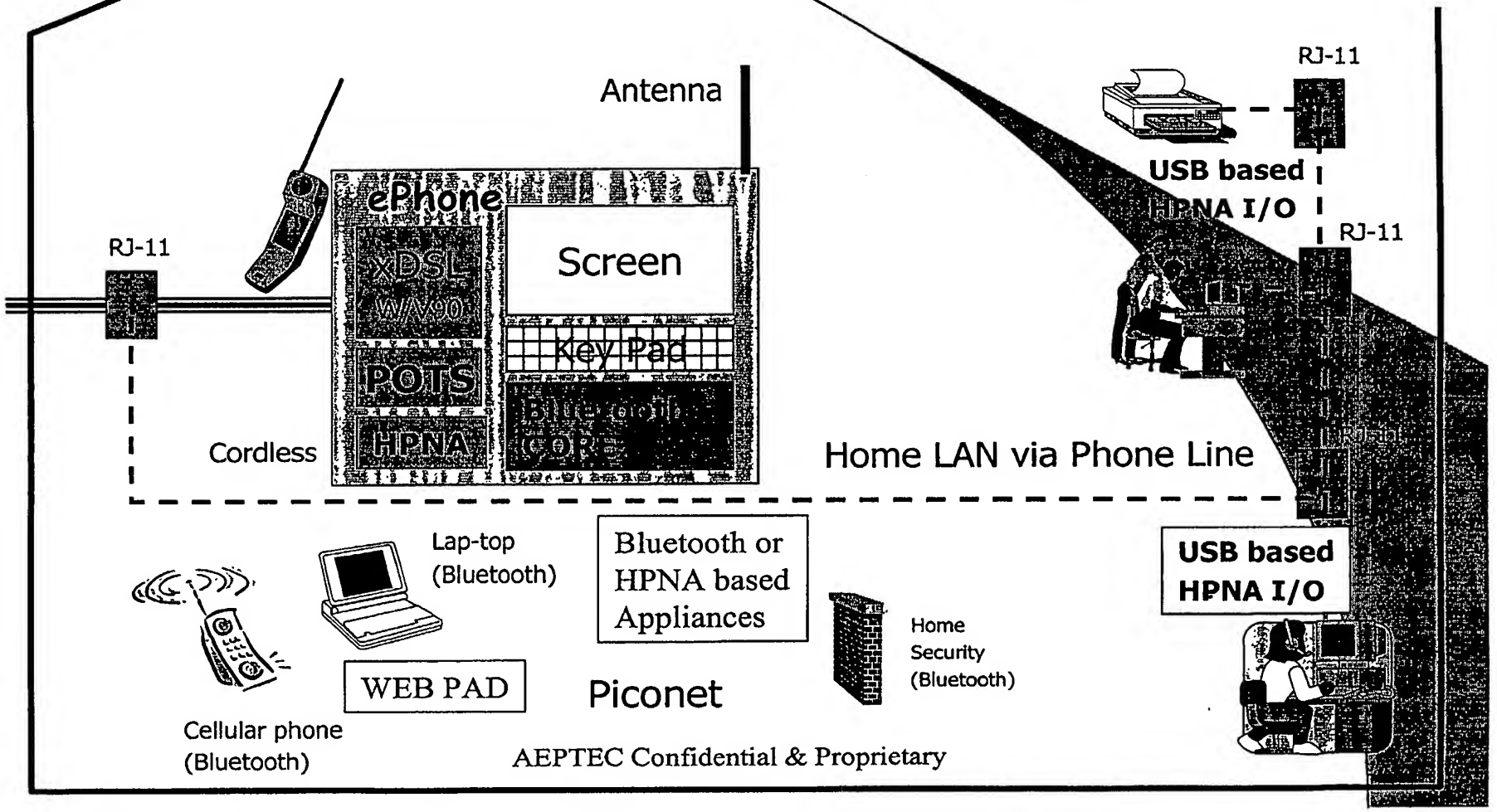
ePhone

An evolutional broadband access device for both in-home and to-home communications

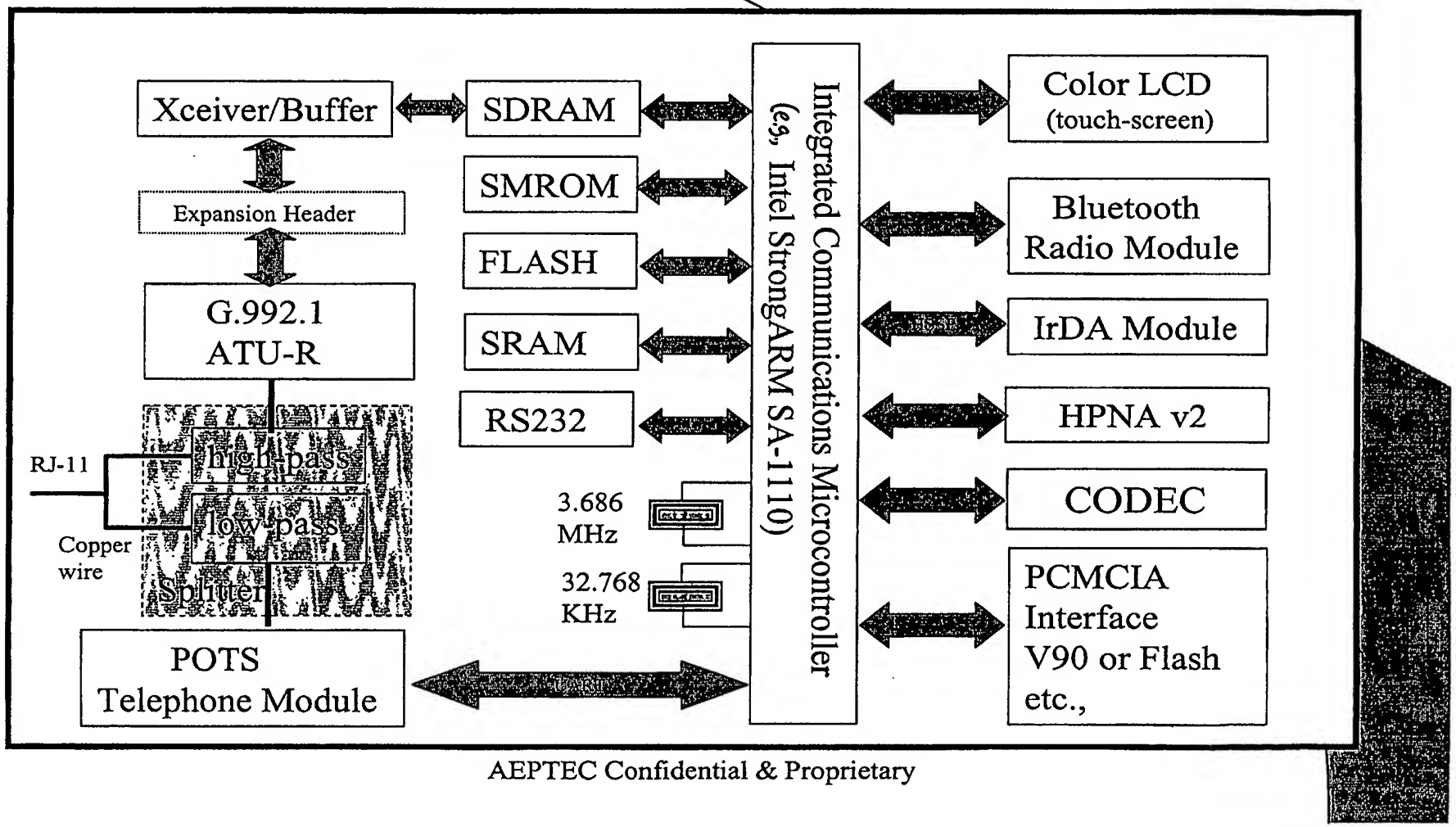
Key Characteristics

- Home appliance based Gateway designed for home consumers.
- First Plug-N-Play Home Gateway product, which hides both IP and Broadband configuration complexity from ordinary users.
- Modular design

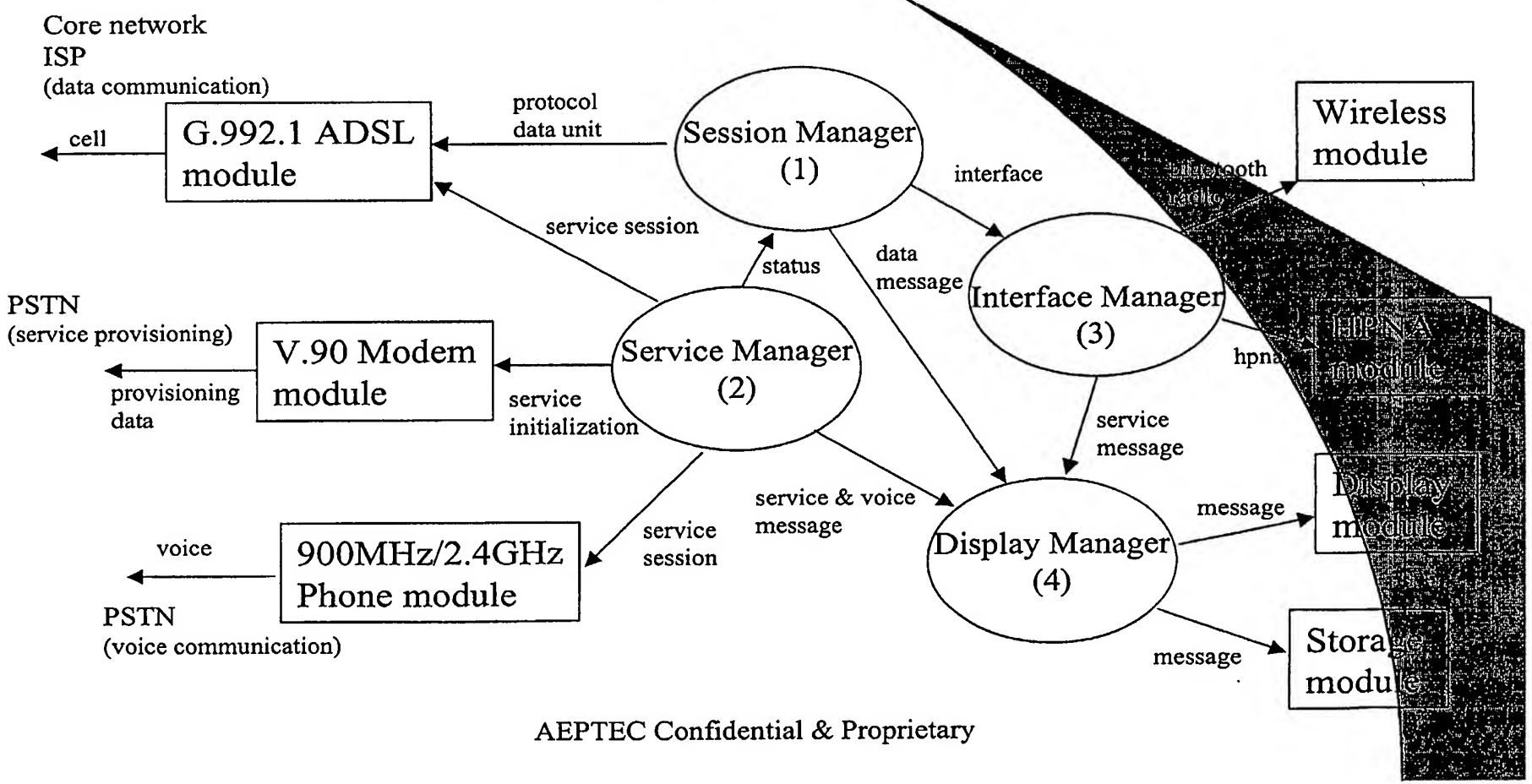
Home Networking



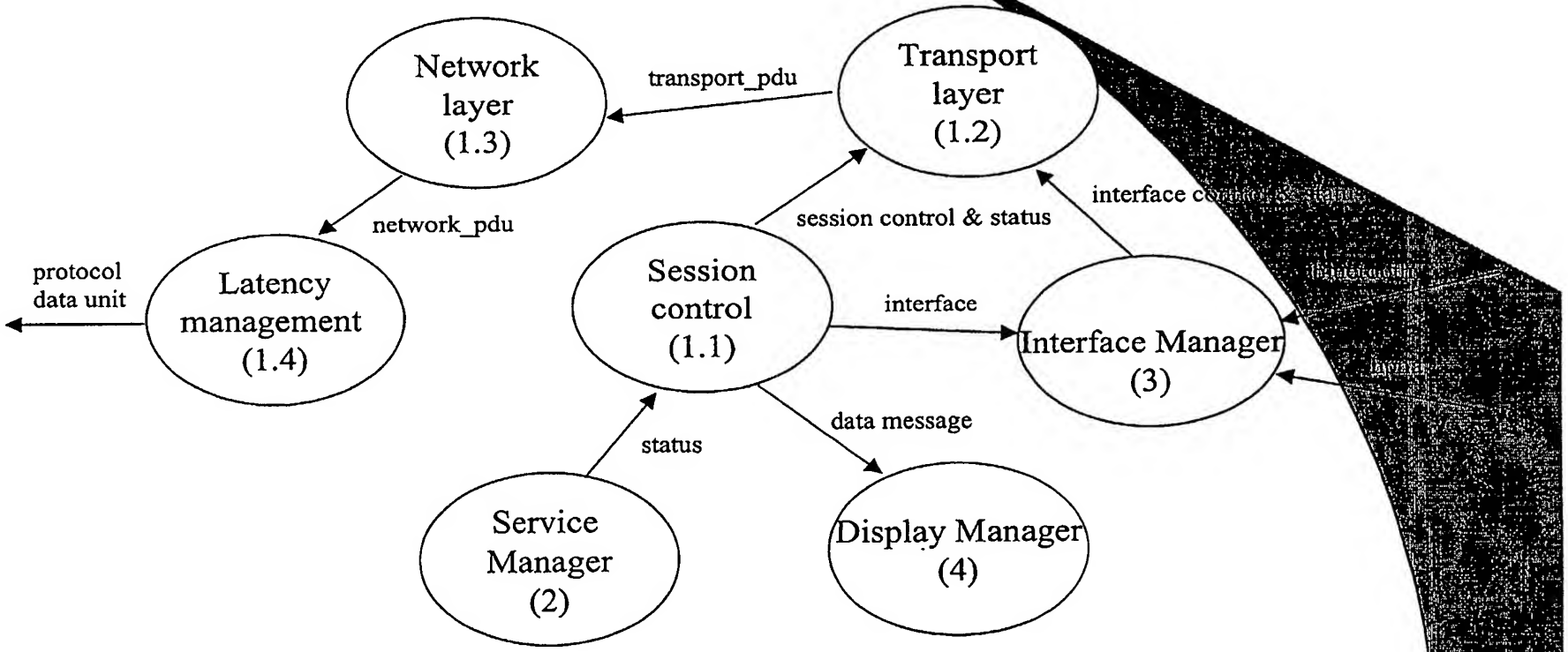
ePhone Architecture



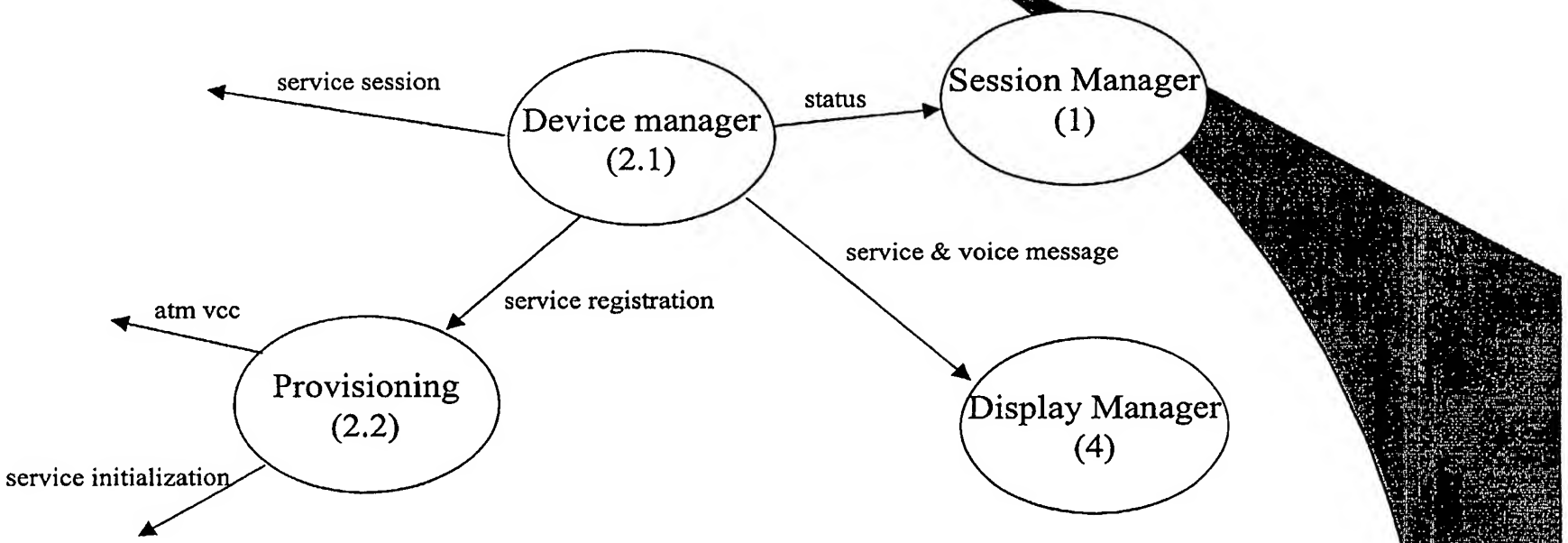
High Level Software Architecture



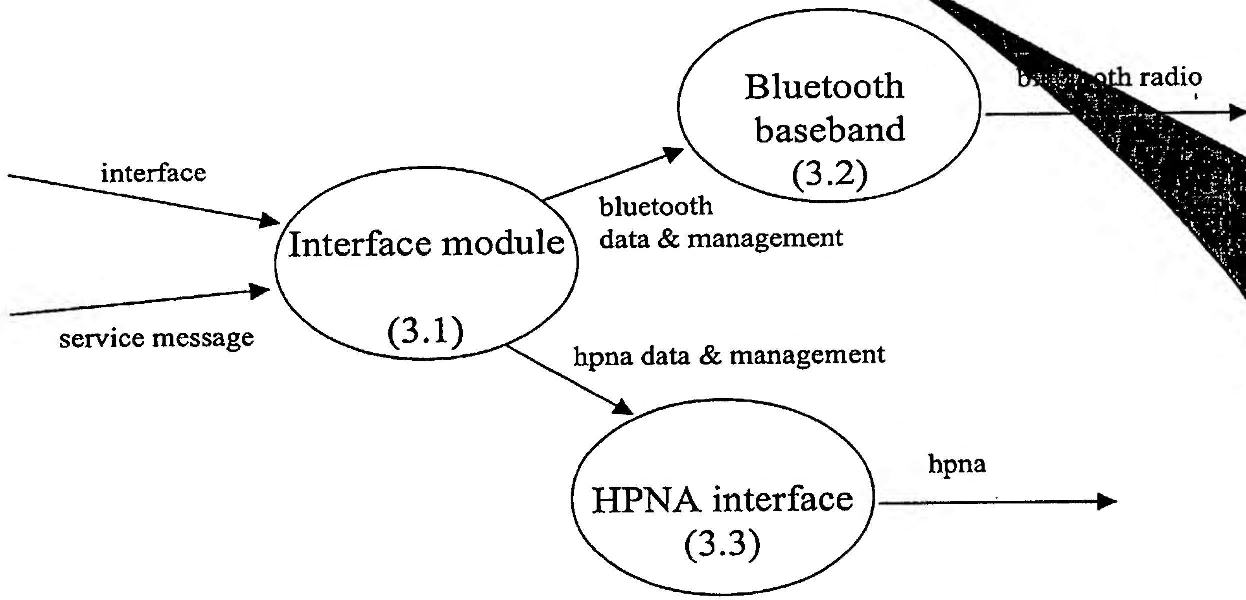
Session Manager



Service Manager

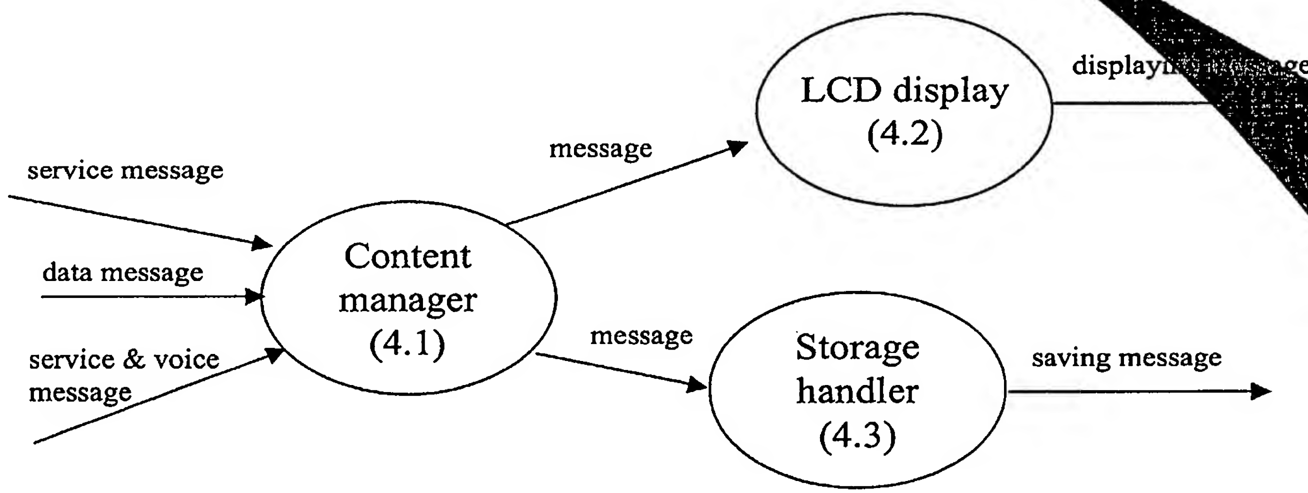


Interface Manager



AEPTEC Confidential & Proprietary

Display Manager



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Product Features

- Plug-N-Play (PnP) made easy
- USB based HPNA module to provide up to 10 Mbps for in-home communications
- Always connected Internet service for multiple users access both voice and data simultaneously
- Provide both wired and wireless for in – and to-home communications
- Smart IP-home ready

Product Features

- PnP Wireless module for IEEE 802.11 or Bluetooth technology
- Build in a thin WAP Proxy Server for WAP-enabled devices to communicate Internet services via PULL & PUSH technology
- Automatic broadband service provisioning